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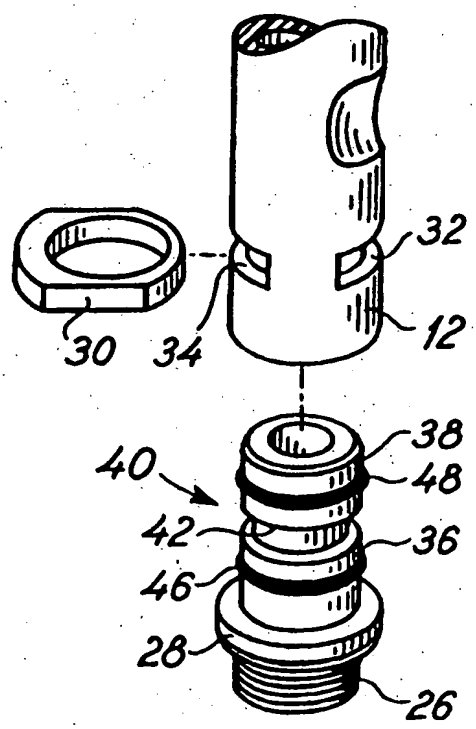
(57) Abstract

A hand shower (10) has a handle (12) defining a first and a second end, in the interior of which handle a connection between the first and the second end is established. The first end constitutes an inlet end for cooperation with a shower hose (22) for supply of water which is supplied to the handle (12) through the shower hose (22) to the interior of the hand shower. The second end constitutes a discharge end for discharge of water from the interior of the hand shower through a plate (16) with apertures. At the first end of the hand shower (10) lockable coupling means are provided for coupling of the shower hose (22) and the handle (12) and comprising a male part (40) and a female part. The female part is arranged so as to receive the male part and sealing means are provided for sealing the connection between the male part and the female part. The coupling means furthermore constitute locking means (30, 42) which are switchable between a first position in which the male part is locked to the female part when the male part is received in the female part, and a second position in which the male part may freely be inserted in and detached from the female part.



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Hand shower for coupling of the handle of a hand shower and a shower hose.

The present invention relates to a hand shower having a handle defining a first end and a second end and in which connection is established between the first end and the second end in the interior of the handle, which first end constitutes an inlet end for cooperating with a shower hose and for supply of water supplied to the handle through the shower hose to the interior of the hand shower, and which second end constitutes an outlet end for discharge of water from the interior of the hand shower through a plate having apertures, the first end of the hand shower being provided with lockable coupling means for coupling of the shower hose and the handle and conprising a male part and a female part arranged to receive the male part, sealing means for sealing of the connection between the male part and the female part when the male part is received in the female part and locking means which are switchable between a first position in which the male part is locked to the female part when the male part is received in the female part and a second position in which the male part may freely be inserted and removed from the female part.

A large number of hand shower assemblies are already known and in this connection the following publications are referred to: DE 30 44 310, DE 31 07 808, EP 0 435 031, DE 21 34 537, DE 20 60 761, DE 39 43 062, US 3,939,086, US 3,826,454, US 5,172,886, WO92/02305 and WO96/00617. In the prior art hand showers the shower hose is coupled to the handle of the hand shower by means of a threaded coupling, and in which a threaded stub is provided in the first end or the inlet end which threaded stub is arranged to cooperate with a threaded union which is fixed to the shower hose.

In most hand shower assemblies the threaded neck is designed as a component integrally cast with the house of the handle which causes the coupling between the hand shower and the shower hose to put severe limitations to the production engineering of the design of the handle of the hand shower as the production technique used, which is often diecasting, does not allow a design of a handle having an outer dimension substantially exceeding the outer diameter of the threaded stub without neccesitating the use of very special casting tools with insertion cores etc. for providing a transition member in the house of the handle between the handle and the threaded stub.

The document EP 0 454 935 discloses a hand shower of the type described above for coupling of a flexible pipe to a shower head which insert ensures both an axial and a radial fixation between the two cooperating components. The assembly provides a secure and reliable fixation but shows the same limitations as the hand shower assemblies mentioned above.

Published British patent application No. 2 087 021, US-patent No. 5 104 158, German published patent application No. 1 775 347, German patent No. 39 33 591 and German published patent application No. 34 40 753 disclose couplings between pipe parts.

The couplings described in the above mentioned publications are all designed to industrial applications and are not meant for applications in connection with hand showers. The couplings are thus designed in a manner making them easy and quick to use and to make an uncoupling of the locking of the coupling for separating the pipe parts. The four first mentioned publications thus disclose assemblies in which the coupling is provided with an projecting element which when activated may provide an uncoupling between the coupling parts and allow separation of the pipe parts. The coupling described in the last mentioned publication is also designed with a protruding part which by insertion in the belonging houses provides uncoupling and disengagement of the pipe parts which may thus be separated. All the assemblies mentioned suffer from the disadvantage that due to the protruding activation components it is possible to provide an unintended activation of the coupling and thus an uncoupling or separation of the pipe parts.

Until now it has only been possible to realize a design of the handle in a hand shower in arbitrary desired size either by production of the above mentioned threaded neck and the handle of the hand shower as separate components which are subsequently assembled by means of gluing, high frequency welding or in other suitable ways, or by means of very complex casting tools which are per se very costly and the technical production of which makes the production of the hand shower more expensive.

It is an object of the present invention to provide a hand shower which allows rotating of the handle of the hand shower in relation to the shower hose.

It is a second object of the present invention to provide a hand shower the lock-

ing means of which are designed in a way so as to prevent unintended activation of the locking means.

It is a further object of the present invention to provide a hand shower of the type described above which may be designed in an arbitrary desired form or size without consideration of the coupling to the shower hose, especially without consideration to the conventional threaded stub which is to cooperate with the threaded union and which thus eliminates the disadvantages mentioned above of the prior art hand shower assemblies.

It is an advantage of the present invention that by using the hand shower according to the invention, which allows rotating of the handle of the hand shower i relation to the threaded union of the shower hose, rotation movements are not transferred from the handle to the shower hose which might otherwise after use for a longer period of time damage the shower hose mechanically and thus reduce the life time of the shower hose.

A second advantage of the present invention is the fact that when using a hand shower the locking means of which is either in line with or is embedded in the surface of the female part, unintended uncoupling of the coupling between the handle and the shower hose is prevented.

A further advantage of the present invention is that the hand shower according to the present invention may immediately be separated from the hose of the hand shower without using tools in order to enable a complete cleaning of the handle of the hand shower, including a decalcification of the face plate and of a nozzle plate, if any, received and supported in the face plate with apertures which is known from numerous of the above mentioned publications.

The objects and the advantages mentioned above are obtained by a hand shower of the type described above which in accordance with the present invention is characterized in that the locking means are arranged so as to allow the male part and the female part to rotate in relation to each other when the locking means are in the above mentioned first position, in that the coupling means constitute a slidable locking part which is received in the handle of the hand shower and which is arranged so as to provide the above mentioned switching of the locking means between the above mentioned first and the above mentioned second position and in that the above mentioned slidable locking part is embedded in or is in

line with the outer surface of the handle when the locking means are in the above mentioned first position.

In the normal or conventional embodiment of the hand shower, the hand shower is used together with a shower hose having a threaded coupling and the coupling means are thus in accordance with the presently preferred embodiment of the hand shower according to the present invention designed so as to the coupling means being connected to the shower hose through a threaded coupling consisting of a thread provided by the coupling means and a threaded coupling mounted on the shower hose.

In the presently preferred embodiment for the hand shower according to the present invention the male part is coupled through a threaded neck to the threaded coupling of the shower hose whereas the female part is designed as an integrated part of the handle of the hand shower which gives a very special simple hand shower embodiment where the handle may advantageously be designed with arbitrary desired exterior diameter and arbitrary desired form the female part simply being arranged with an aperture to be determined solely considering technical limitations as regards the casting, including considering filling of an injection mould to be used for the production of the handle of the hand shower. Is is well known to persons skilled in the art that by injection-moulding an arbitrary size of wall thickness cannot be provided, but for the material in question an upper unambiguous limit exits for the wall thickness to be produced without problems and without using very complex and very special injection-mould forms. Thus, in this embodiment the male part is produced with a threaded neck arranged for cooperating with the shower hose of the threaded coupling and in such a manner that it may be received in the female part and is accordingly designed in accordance with the dimensions of the female part determined by the geometry of the handle.

In the hand shower according to the present invention the sealing means may be constituted by arbitrary suitable sealing elements or sealing components such as gaskets, sealing rings, sealing flaps etc., but in the presently preferred embodiment of the hand shower according to the present invention the sealing means are constituted by sealing rings, especially O-rings, which are received in peripheric, annular recesses in a circular outer surface of the male part. By designing the male part with a circular outer surface and correspondingly by designing the female part with a circular inner surface corresponding to the circular outer

surface of the male part it is furthermore possible to rotate the hand shower freely in relation to the threaded coupling of the shower hose which in numerous situations provides the advantage that by using the hand shower to be moved between different holders, the rotation movements are not transferred from the handle to the shower hose which may otherwise after use for a longer period of time damage the shower hose mechanically and thus reduce the time of living of the shower hose.

In the coupling means in the hand shower according to the present invention the locking means may be constituted by an arbitrary suitable component such as a dowel, a locking cam, a bayonet locking ring etc. In the presently preferred embodiment of the hand shower according to the present invention the locking means is constituted by a slider having a through-going bore through which the male part may be inserted when the slider is in its second position and which engage with a peripheric recess in the male part when the slider is in its first position. This embodiment of the locking means gives a special simple construction which furthermore in combination with the above described sealing means provides a stable and tight hand shower assembly.

In the embodiment of the hand shower described above according to the present invention the slidable locking part is designed with a slider having a through-going bore and through which the male part may be inserted when the slider is in its second position and which engage with a peripheric recess in the male part when the slider is in its first position. This slider may further advantageously be designed with an outer surface which is embedded in the outer surface of the handle when the slider is in its first position which provides an attractive embodiment in which the coupling means characteristic of the present invention, including the locking means of the coupling means, are hidden in the handle of the hand shower and do not aesthetically damage the appearance of the hand shower and at the same time the embedded position of the slider eliminates the risk of unintended activation of the locking means and thus an uncoupling of the female part from the male part during use.

The hand shower according to the present invention may advantageously be designed as a hand shower which except from a quick and comfortable coupling to the shower hose by means of the locking means characteristic of the present invention may advantageously be designed with a coupling, especially a bayonet coupling, at the other end of the handle in order to enable displacement of the

head of the hand shower partly for cleaning, especially for decalcification of the insert of the shower head, or rather of the nozzles of the insert of the shower head, partly for renewal of the insert of the shower head due to abrasion, calcification or shift from one function to another function.

The insert of the shower head according to the present invention is advantageously designed as a multi-function shower head insert which in accordance with an especially advantageous embodiment of the present invention constituting a special aspect of the present invention is divided into several shower head sections which are separated and sealed in relation to each other by means of a single sealing body containing self-cleaning, water distributing nozzles for supplying water to the various shower head sections and which, furthermore, have switchable water distributing means for distribution of water from the interior of the hand shower to one or more of the sections of the hand shower insert mentioned above.

Furthermore, the insert of the shower head according to the present invention may advantageously be designed with the shower head insert having two, three or more sections and constituting a shower for two, three or more separate functions or two, three or more combined functions.

The embodiment of the shower head insert described above for the hand shower according to the present invention as a multi-function shower head insert may however just as well be realized in a separate, stationary shower, for instance a shower mounted in the wall or in the ceiling and utilizing the above described advantages of the shower head insert in relation to simple construction, elimination or reduction of risk of calcification and ideal sealing between the separate chambers or sections of the insert.

In the following the invention will be further described with reference to the drawings in which

fig. 1 is a schematic and perspective view of a hand shower according to the present invention having a coupling according to the invention and a belonging hand shower hose,

fig. 2 is a schematic and perspective view of a detail of the coupling of the hand shower illustrated in fig. 1,

fig. 3 is a schematic and perspective view corresponding to fig. 2 illustrating a detail of an alternative embodiment of the hand shower according to the present invention,

fig. 4 and 5 are schematic and partly sectional views of the hand shower illustrated in fig. 3 in coupled position and in partly uncoupled position, respectively,

fig. 6 is a schematic and partly sectional view of the shower head of a hand shower seen from below,

fig. 7 is a schematic and partly sectional view of the shower head illustrated in fig. 6, and

fig. 8 is a schematic, perspective and separated view of the shower head illustrated in figs. 6 and 7.

Fig. 1 illustrates a hand shower according to the present invention in its entirety designated the reference numeral 10. The hand shower 10 has a handle 12 which in the embodiment of fig. 1 has the form of a vaguely conical and vaguely curved hollow component on the one side of which, i.e. the inwardly curved side, a number of notches are provided for cooperating with the fingers of a user. The handle 12 extends it its broadest or at its upper end into a circular cylindrical house 14 in which a face plate 16 is provided. The face plate 16 is designed with a number of through-going perforations 18 and supports a sieve plate received in the face plate 16 and in the circular cylindrical house 14 which sieve place is preferably designed in accordance with the technique which is disclosed in the applicant's international patent application, application No. PCT/DK95/00261, international publication No. WO 96/00617. The face plate 16 and its corresponding sieve plate are locked to the circular cylindrical house 14 by means of a locking coupling which is served by means of a finger grip 20 so that turning of the finger grip from the position illustrated in fig. 1 upwardly in clockwise direction uncouples the face plate 16 and the corresponding sieve plate from coupling to the hollow cylindrical house 14, whereas the finger grip 20 in the position illustrated in fig. 1 in which position the finger grip 20 is turned downwardly counter-clockwise to the lowest locking position locks the face plate 16 to the hollow circular cylindrical house 14 and thus to the handle 12.

In the opposite end of the face plate 16, i.e. in the tapered or lowest end of the vaguely conical, hollow handle 12, a coupling device according to the present invention for coupling of the hand shower 10 with a hand shower hose 22 is provided which ends in a threaded coupling 24 of conventional embodiment as a half inch threaded coupling. The coupling of the hand shower 10 is illustrated in more details in fig. 2 illustrating the lower tapered end of the handle 12.

In the handle 12 which is preferably cast of a plastics material such as ABS, PVC, PP, PE or another suitable corrosion resistant material, e.g. aluminum, two recesses 32 and 34 positioned opposite each other are designed in which as illustrated in fig. 1 a locking slider 30 is adopted. In the interior of the handle 12 a cylindrical inner wall is provided in the lower tapered end, i.e. within the recesses 32 and 34 which cylindrical inner wall serves as adaption of the male part 40 which is illustrated in fig. 2 in a position uncoupled from the handle 12. The male part 40 has an upper end which is arranged to be received in the interior of the handle 12 and a lower part constituting a flange 28 and an external screw thread 26 which are both positioned outside the handle 12 when the male part 40 is coupled to the handle 12 as illustrated in fig. 1. The upper part of the male part 40 which is received in the interior of the handle 12, constitutes two cylindrical parts 36 and 38 which are positioned having the cylindrical part 38 uppermost in a distance above the cylindrical part 36 defined by the cylindrical part 42 which has a reduced exterior diameter compared to the cylindrical parts 36 and 38. In the cylindrical parts 36 and 38 peripheric tracks are provided in which tracks O-rings, 46 and 48 respectively, are received.

The male part 40 may be received in the interior of the handle 12 and seals in relation to the inner circular cylindrical wall of the handle 12 by means of the O-rings 46 and 48. The male part 40 is locked in relation to the handle 12 by the slider 30, which in a locked position, as illustrated in fig. 1, is received hidden in the handles so that the exterior edge surfaces of the slider are in line with the exterior wall of the handle 12. The male part 40 is coupled from the handle 12 by sliding the slider 30 to an uncoupled position as will be described below with reference to figs. 4 and 5.

The provision of a coupling between the handle 12 and the hand shower hose 22 primarily ensures the following three advantages. Firstly, the coupling makes it possible to design the handle 12 of the hand shower 10 with an arbitrary desired

outer diameter for coupling with the coupling 24 of the hand shower hose 22. In a conventional shower without the coupling according to the present invention, the screw thread with which the handle of the hand shower must be provided for coupling to the screw thread 24 of the hand shower hose causes limitations in relation to the maximum size of the handle unless the hand shower, which is extremely costly, is constituted by a number of individually cast parts to be welded or glued together. Alternatively, a specific embodiment of the hand shower may only be realized by using very special casting techniques according to which the handle is formed or cast by use of special slidable insertion cores. The provision of the coupling between the handle and the hand shower hose enables the production of the handle, corresponding to the handle 12 in fig. 1, in arbitrary desired design when only the handle in its lowermost end is provided with an inner circular cylindrical wall to which the male part corresponding to the male part 40 shown in fig. 2 is formed with correspondingly formed circular cylindrical parts corresponding to the parts 36 and 38 which may be formed having a large or a small diameter i relation to the embodiment illustrated in fig. 2. The only limitation in relation to dimensions of the hand shower is determined by the thread 26 the dimensions of which are determined by the screw thread 24 of the hand shower hose 22. Secondly, the coupling between the hand shower hose and the handle provides the advantage that the hand shower may turn in relation to the hand shower hose, as the locking between the slider 30 and the male part 40, more specifically the locking between the slider 30 and the cylindrical part 42 with reduced diameter, allows the handle 12 to turn in relation to the male part 40 and thus also in relation to the hand shower hose 22. Thirdly, the coupling provides the advantage that the separation between the handle of the hand shower from the hand shower hose, for instance for cleaning or for renewing of calcinated parts, is simply performed without the use of tools, as the male part 40, which is fixated to the threaded coupling 24 of the hand shower hose 22, is uncoupled from the handle 12 as will be explained in further details below whereafter the handle 12 may be cleaned or serviced.

Fig. 3 illustrates a hand shower 10 constituting an male part 40' which mainly corresponds to the male part 40 described above with reference to fig. 2, but differs from the male part of fig. 2 by having only one single O-ring, i.e. the O-ring 48', on the cylindrical part 38' of the male part 40'.

Fig. 4 is a view of the male part 40' corresponding to fig. 3 in a position in which the male part 40' is locked in relation to the hand shower 10'. The lock-

ing of the male part 40' in relation to the hand shower 10' is provided by the slider 30' which engage behind the circular cylindrical parts 36' and 38', an inner flange of the slider 30' provided by an eccentrically formed circular house abutting on the circular cylindrical part 42'.

Contrary to the position shown in fig. 4 in which the male part 40' is locked in relation to the hand shower 10', the male part 40' is freely detachable from the hand shower 10' in the position shown in fig. 5 in which the slider 30' is moved to the left so that the outer circular flanges of the slider are positioned protruding from the exterior wall of the handle 12' and embedded in relation to the exterior wall, respectively. In the position illustrated in fig. 5 the eccentrically formed circular hole in the slider 30' is placed in line with the circular cylindrical inner wall of the hand shower 10' so that the male part 40' may be detached from the hand shower 10'.

Figs. 6 and 7 illustrate schematically and seen from below and in sectional view, respectively, a shower head for a hand shower according to the present invention. The shower head illustrated in figs. 6 and 7 constitutes the handle described above with reference to fig. 1 of the drawing and a shower head insert shown in further details in separated state in fig. 8, and the shower head similarly illustrated in fig. 8 may, however, constitute a separate shower head for use or application in an arbitrary hand shower assembly or alternatively a shower head for a stationary shower such as a shower mounted in the wall or in the ceiling. The shower head assembly illustrated in figs. 6, 7 and 8 constitute an improved development of the shower head assembly disclosed in the applicant's previously filed international patent application, application No. PCT/DK95/00261, publication No. WO96/00617, the shower head assembly described in figs. 6-8 being distinct from the prior art shower head assembly by one single elastomer body or rubber body in the shower head being used for provision of separation between the individual chambers of the shower head for sealing between the chambers and from the interior of the shower head in relation to the surroundings and finally for provision of self-cleaning water distribution and flow reducing nozzles in the interior of the shower head.

In fig. 6-8 of the drawing the same reference numerals are used as used above for the same or identical component whereas for components having the same function as described or explained above, but designed or configurated differently as described above, the same reference numerals as previously are used, how-

ever with the addition of a mark in the form of ' or ''.

The shower head illustrated in figs. 6-8 constitute a separate component which is directly replaceable in the handle 12 described above with reference to fig. 1 and thus may replace the face plate 16. The shower head insert is designated the reference numeral 60 in its entirety and constitutes a so-called 3/6 function shower head insert, i.e. a shower head insert enabling the use of the hand shower in three different ways or alternatively three supplementary ways of combination. The three ways of function are determined by three areas in the bottom of the hand shower, more explicitly a first area with elastic and flexible, self-cleaning nozzles 18', a second area with water jet apertures 18'' and a third area with elastic self-cleaning and flexible rubber nozzles 18'''. The first nozzles 18' constitute nozzles serving the same function as the nozzles mounted in the face plate 16 described above and thus constitute nozzles discharging a constant quantity of water and fluid. The apertures 18'' constitute apertures providing a jet discharge in which together with the water jets a strong mixing with air has taken place whereas the nozzles 18'' constitute nozzles from which pulsating water jets are discharged.

The shower head 60 comprises, as illustrated in fig. 8, a central body 70 constituting a combined rotatable body and water distributing body having an interior wall 72 from which separation walls 80 and 82 extend downwardly. In the walls 72 and in the separation walls 80 and 82 three sets of through-going apertures 74, 76 and 78 are provided, each aperture constituting three holes for distribution of water and three inner chambers in the interior of the shower head corresponding to the three different functions described above and the three areas described above. In the wall 72 a through-going aperture 84 is centrally provided serving the purpose of clamping the individual parts of the shower head insert. The body 70 furthermore constitutes an exterior wall 86 serving the purpose of shifting between the functions of the hand shower insert described above.

On the body 70 a locking ring component 90 is mounted constituting the finger grip 20' described above and having bayonet locking parts 92 and 94 for engagement with corresponding dowels in interior of the hand shower grip 12. In the locking ring 90 a plate 96 is furthermore received having a centrally through-going aperture 98 and three longish apertures 100, 102 and 104 serving the purpose of establishing a fluid connection from the interior of the handle 12 to the distribution apertures 74, 76 and 78 in the body 70. In an annular peripheric

track in the plate 96 a sealing ring 108 is adapted for sealing against the inner side of the locking ring 90.

A screw 110 serves the purpose of clamping of the parts of the shower head insert which screw is adapted in a sleeve 112 and clamps the parts described above and supplementary parts which are shown in the left part of fig. 8 and which will be described in further details below, by means of a three-flap spring body 114 designed with three through-going apertures 116, 117 and 118 for cooperating with the apertures 100, 102 and 104 in the plate 96 described above.

Below the component or the part 70, an elastomer body or a rubber body 102 is mounted providing the entire sealing, fluid distribution and water jet regulation in the insert of the shower head in all three functions stated above. The body 120 thus constitutes a plane, horizontal wall part 122 from which the nozzles 18' extend downwardly, a cylindrical perpendicular wall part 124 extending from the plate, horizontal wall part 122 into another plane and horizontal wall part 126 in which water nozzles 128 are provided which are interior, self-cleaning, water regulating and water distributing nozzles being in connection with a chamber which opens into the apertures 18'' described above and continues via a smaller, perpendicular cylindrical wall 130 into a plane plate 132 in which similarly interior, self-cleaning water regulating and water distributing nozzles 134 are provided which are connected to an interior chamber in the shower head insert in which the above described pulsating function is provided. Below the elastomer body 120, a wall component sealing against the elastomer body is mounted in which wall parts are formed corresponding to the wall parts described above and which are thus formed with a plane wall part 142 corresponding to the wall part 122, a wall part 144 corresponding to the wall part 124, a wall part 146 corresponding to the wall part 126 and finally a wall part 148 corresponding to the wall part 132. From the component 140 a cylindrical wall part 150 furthermore extends downwardly and similarly corresponding to the above described nozzles 18, 128 and 134 corresponding apertures 152, 154 and 154, respectively, are established in the respective wall parts 142, 146 and 148.

In an annular chamber established between the cylindrical wall 144 and the downwardly protruding wall 150 an air/water mixing body is adapted which is composed of two parts 158 and 160. The part 158 constitutes an annular plate part in which apertures 162 corresponding to the nozzles 128 are provided, the apertures 162 being mounted opposite to and in registration with the nozzles

128. In the part 160 constituting an annular part having interior troughed cavities, the above described apertures 18'' are provided. The apertures 18'' are not, however, as indicated in fig. 8, located opposite and in registration with the apertures 162, the apertures 162 in the plate formed part 158 being placed opposite the interior troughed cavities in the annular part 160 which troughed cavities are in tangential connection with the apertures 18''. By this leading of water from the nozzles 128 through the apertures 162 and further down into the interior troughed cavities in the annular component 160 and from these troughed cavities tangentially to the apertures 18'', a very strong mixing of water with air and thus a very soft air/water jet formation is obtained.

The shower head insert 60 finally constitutes three components 164, 166 and 68 for provision o the above described pulsating water jet discharge. The component 164 constitutes a water jet driven or water turbine driven closing wheel comprising driving blades 165 and a closing plate part 168 for covering of apertures in a bottom plate in the component 168 when the component 164 is brought to rotate by water turbine effect. Below the component 164 the component 166 is mounted which component constitutes a sealing plate and water nozzle plate formed by an elastomer body or rubber body in which the downwardly protruding self-cleaning nozzles 18''' are provided. Finally, the component 168 constitutes a combined upper plate 170 in relation to the component 166 and a shaft part 172 ending in an upper square part 174 serving the purpose of cooperating with the locking sleeve 112 by screwing the screw 100 in the interior thread of the shaft interior of the shaft part 172. The upper plate 170 is designed with apertures corresponding to the nozzles 18''' in the component 166 and furthermore provides by cooperating with downwardly protruding claps 176 of the annular part 160 apertures between these flaps through which apertures air may be lead into the interspace between the inner wall of the annular part 160 and the wall 150 of the component 140 for provision of the above described air/water mixing function in the annular part 160.

In the above described shower head insert the elastomer body or the rubber body 120 constitutes an integrated 3-function body for provision of chamber separation, sealing and finally self-cleaning fluid distribution and nozzle function in the shower head insert. This integration of several functions, and especially sealing and self-cleaning function by water distribution in the interior of the shower head, may however in accordance with the teachings of the present invention just as well be established in 2/4-function shower head assemblies, i.e. shower

head assemblies in which, instead of a 3/6-function shower as described above with reference to figs. 6-8 of the drawing, two or alternatively two combinations of two shower functions are provided.

The above described shower head insert illustrated in figs. 6 and 7 and more detailed in fig. 8 may be produced of the above described materials for the handle 12, specially produced of plastics materials such as ABS, PVC, PEP, PE and PU, and to the parts 112, 114, 96, 90, 70, 140, 158, 160, 164 and 168 any of the above mentioned plastics materials ABS, PVC, PEP and PE may be used, whereas the elastomer bodies or the rubber bodies 120 and 166 are preferably produced of PU which in itself has a water repellent characteristic. The component 158 may alternatively be produced of hard PU in order to utilize the water repellent characteristic of this material.

The above described shower head insert which may be part of a hand shower or a stationary shower or may be implemented as a shower head integrated in a shower assembly provides by using a single elastomer body or rubber body for formation of separation between the individual chambers of the shower head, for sealing between the chambers and from the interior of the shower head in relation to the surroundings and finally for provision of self-cleaning water distribution and jet reducing nozzles in the interior of the shower head further advantages compared to conventional shower head assemblies in which the shower head is composed of several individual components which are sealed by means of O-rings, gaskets etc. as the shower head insert according to the present invention exhibits a reduced height compared to such already known, complicatedly compounded shower head assemblies. The use of rubber nozzles or self-cleaning nozzles for distribution and jet reduction of the water in the interior of the shower head furthermore provides a self-adjusting pressure compensation as the same nozzle construction may be used for such varying pressures as for instance the usually present water pressure in Denmark of the order of 2-3 ato and ranging to water pressures of the order of 0.1 - 0.2 ato which are usual in Great Britain. This pressure compensation may by the way be utilized in an alternative embodiment in which a composed elastomer body or rubber body is utilized for provision of the above described function in relation to chamber division, sealing and water distribution and jet reduction.

The coupling embodiment characteristic of the present invention in a hand shower furthermore allows in a simple way the integration of per se prior art jet

regulating for reducing elements such as a check valve, a pressure-limiting valve or a flow-limiting valve which are statutory in some countries, but are not used in other countries or cannot be used due to the existing water pressure conditions.

Even though the invention described above is described with reference to a number of presently preferred and advantageous embodiments it will be obvious to persons skilled in the art that within the scope of the invention as defined in the following patent claims numerous modifications and alterations may be performed without deviating from the spirit and intention of the invention. Accordingly, such modifications may be construed part of the rights defined in the patent claims.

PATENT CLAIMS

1. Hand shower with a handle (12), defining a first end and a second end, connection between the first and the second end being established in the interior of the handle, which first end constitutes an inlet end for cooperating with a shower hose (22) and for supply of water which is provided to the handle (12) through the shower hose (22) to the interior of the hand shower, and which second end constitutes a discharge end for discharge of water from the interior of the hand shower through a plate with apertures (16), lockable coupling means being provided at the first end of the hand shower (10) for coupling of the shower hose (22) and the handle (12) and comprising an male part (40) and an female part arranged to receiv the male part, sealing means (46, 48) for sealing of the connection between the male part and the female part when the male part is received in the female part, and locking means (30, 42) which are switchable between a first position in which the male part is locked to the receiving part when the male part is received in the female part and a second position in which the male part may freely be inserted in and detached from the female part, **CHARACTERIZED** in that the locking means (30, 42) are arranged so as to allow the male part (40) and the female part to rotate in relation to each other when the locking means (30, 42) are in the above mentioned first position, in that the coupling means (30, 42) constitute a slidable locking part (30) which is received in the handle (12) of the hand shower (10) and which is arranged so as to provide the above mentioned switching of the locking means (30, 42) between the above mentioned first and the above mentioned second position and in that the above mentioned slidable locking part (30) is embedded in or is in line with the outer surface of the handle (12) when the locking means (30, 42) are in the above mentioned first position.

2. Hand shower according to claim 1, **CHARACTERIZED** in that the coupling means are connected to the shower hose through a threaded coupling comprising a thread (26) which is provided at the coupling means and a threaded coupling (24) which is mounted on the shower hose (22).

3. Hand shower according to claim 1 or 2, **CHARACTERIZED** in that the male part is connected to the shower hose whereas the female part is connected to the handle (12).

4. Hand shower according any of the claims 1-3, **CHARACTERIZED** in the slidable locking part (30) being formed as a slider (30) having a through-going bore through which the male part may be inserted when the slider is in its second position and which engages with a peripheric recess in the male part (40) when the slider is in the first position.

5. Hand shower according to any of the claims 1-4, **CHARACTERIZED** in coupling means for receiving a separate shower head insert (60) being provided at the second end of the handle (12).

6. Hand shower according to claim 5, **CHARACTERIZED** in the shower head insert (60) being divided into a number of shower head sections which are separated and sealed in relation to each other by means of a single sealing body (120) including self-cleaning, water distributing nozzles (18', 128, 134) for discharge of water to the individual shower head sections and furthermore having switchable water distributing means (70, 74, 76, 78, 100, 102, 104) for distribution of water from the interior of the hand shower to one or more of the above mentioned sections of the hand shower insert.

7. Hand shower according to claim 6, **CHARACTERIZED** in the shower head insert (60) having two, three or more sections and constituting a shower for two, three or more separate functions or two, three or more functions in combination.

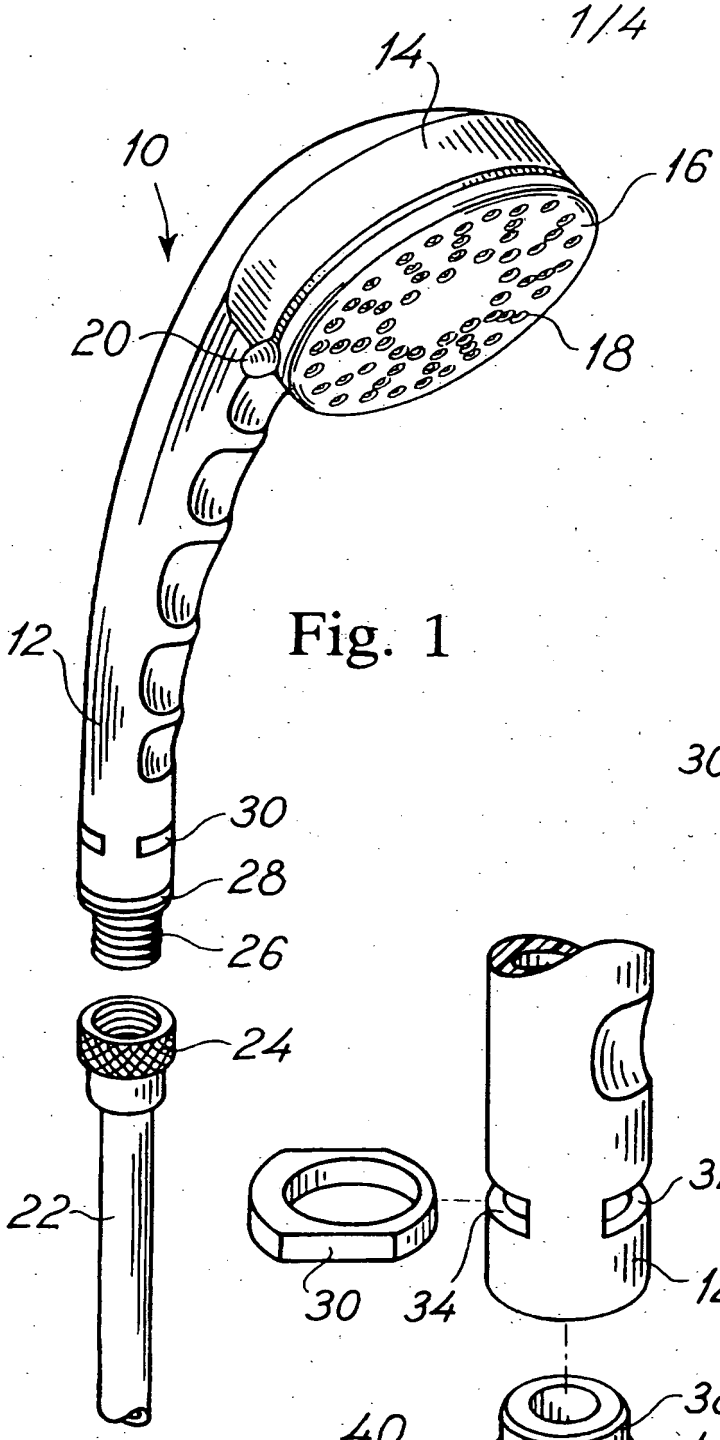


Fig. 1

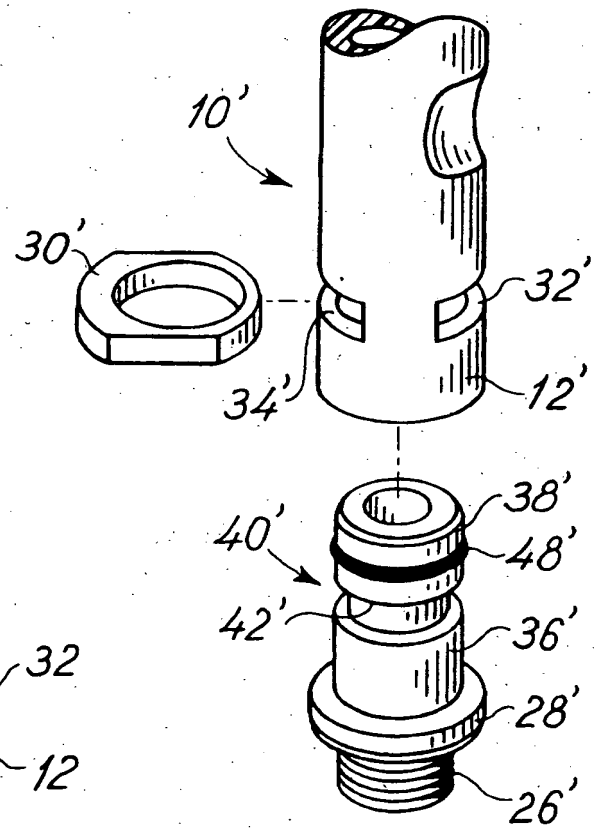


Fig. 3

Fig. 2

Fig. 4

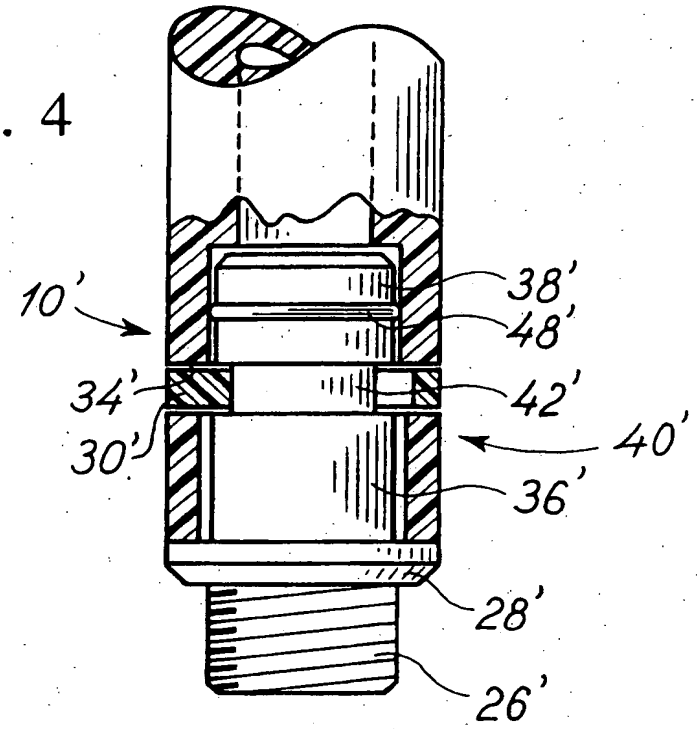


Fig. 5

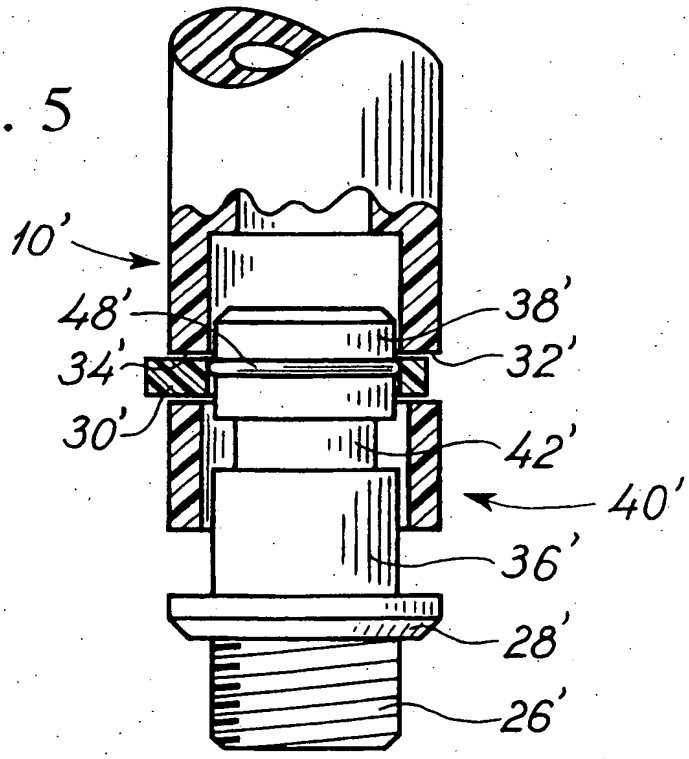
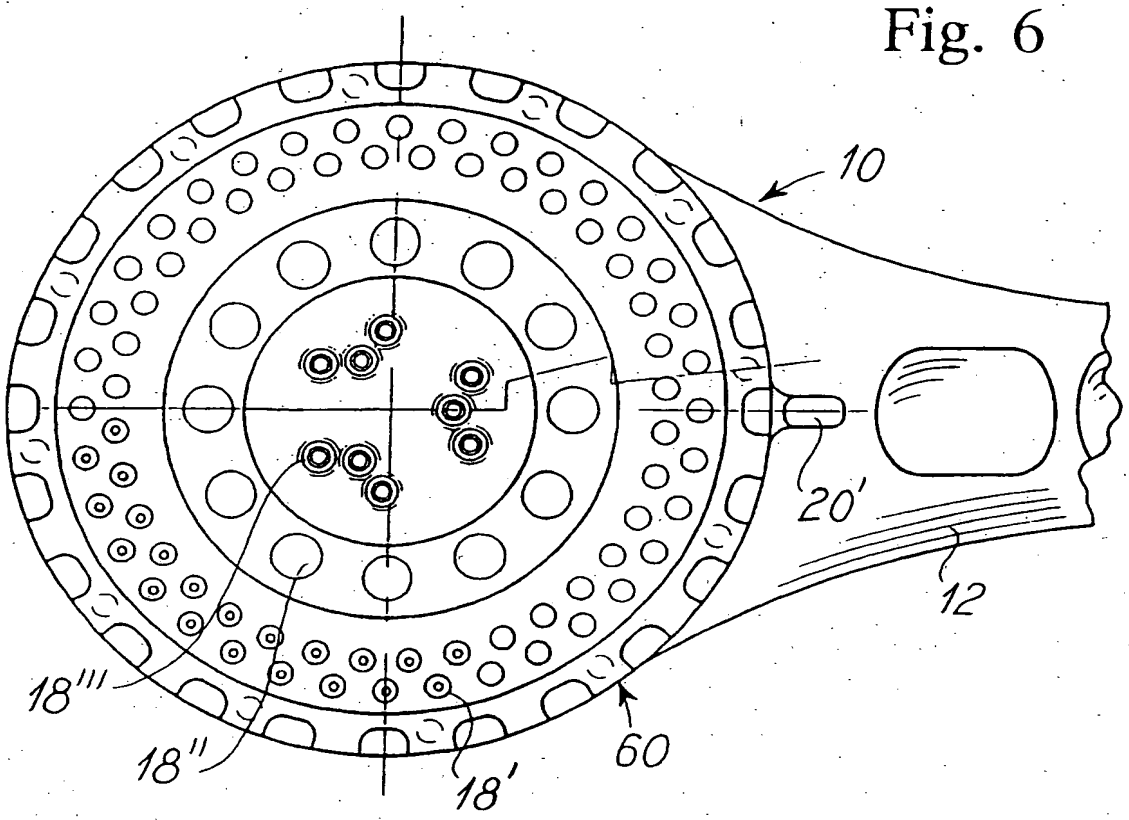
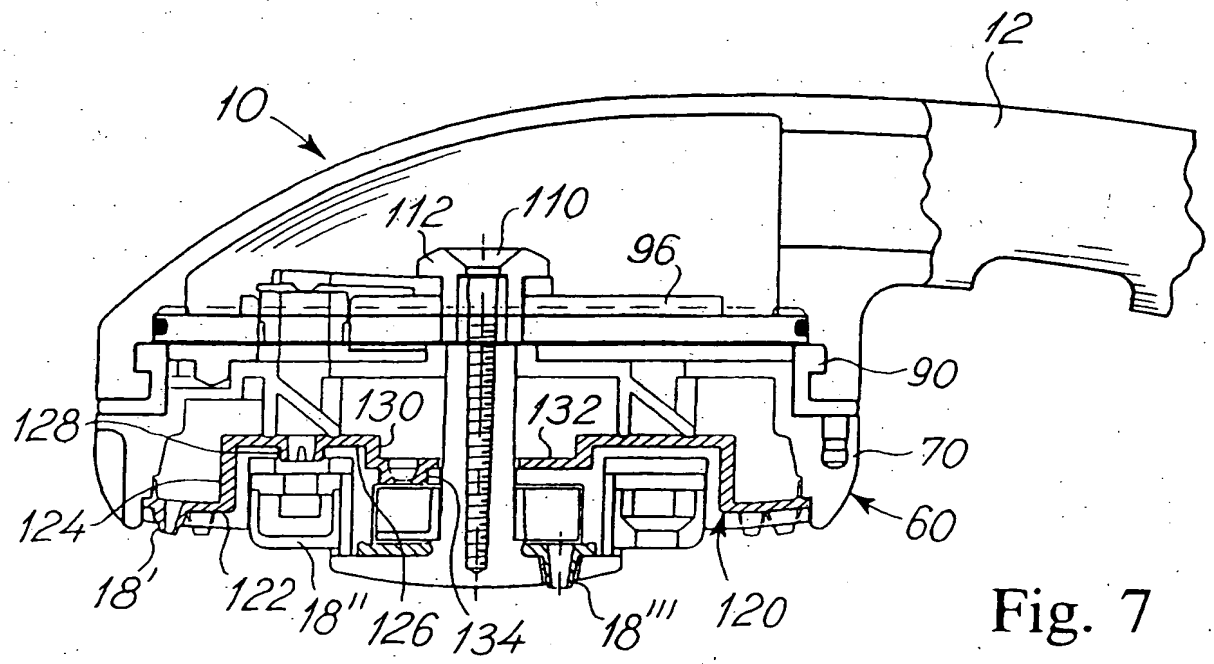


Fig. 6


10
20'
12
18'''
18''
18'
60


12
10
112
110
96
90
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132
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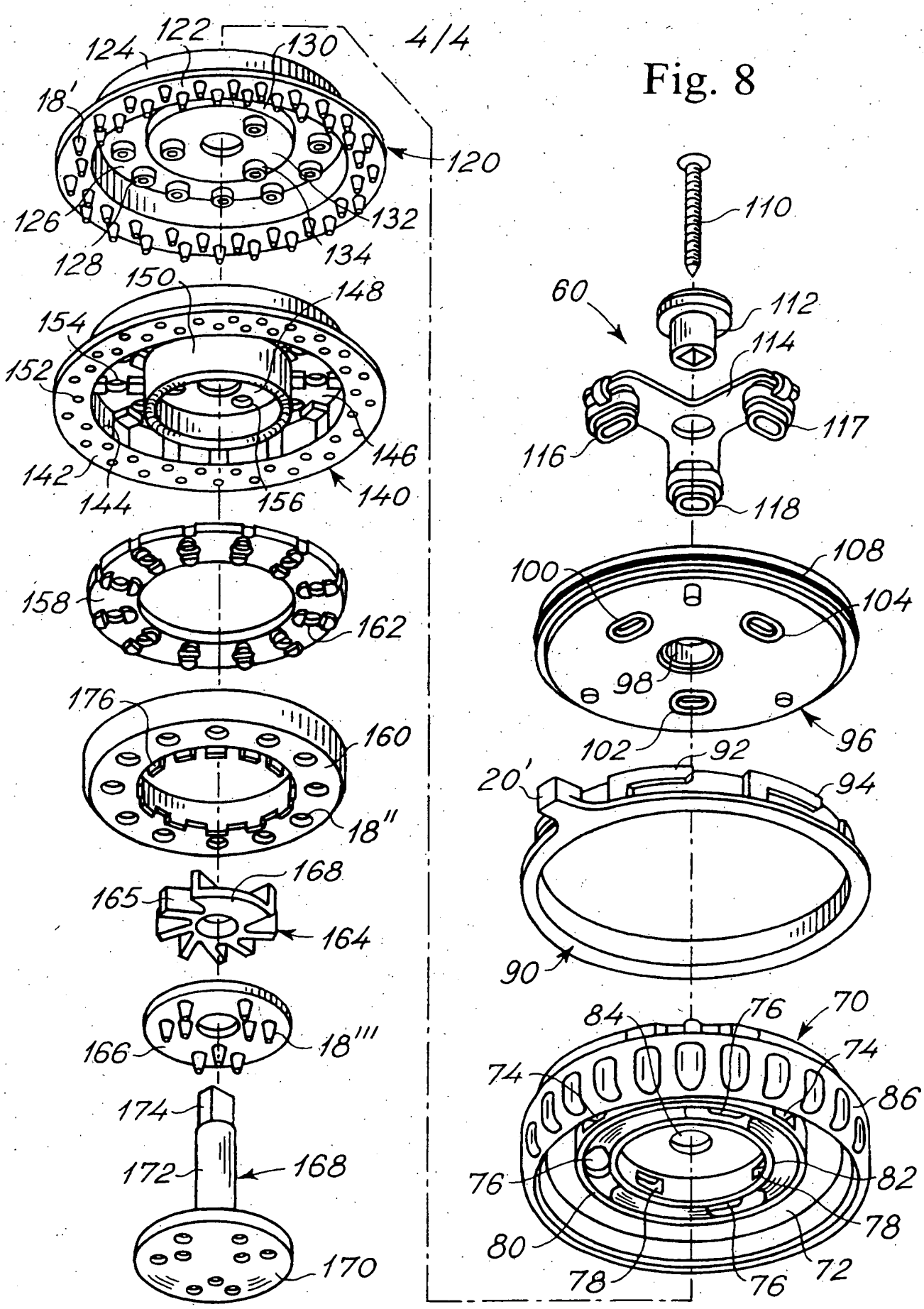
70
124
60
18'
122
18''
126
134
18'''
120

Fig. 7

Fig. 8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168
170
110
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116
118
108
100
104
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96
92
20'
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84
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INTERNATIONAL SEARCH REPORT

International application No.
PCT/DK 97/00274

A. CLASSIFICATION OF SUBJECT MATTER

IPC6: B05B 1/18
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC6: B05B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

WPIL, EDOC

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5297735 A (HEIMANN ET AL), 29 March 1994 (29.03.94)	1-5
Y	--	6-7
X	EP 0621077 A1 (HANS GROHE GMBH & CO KG), 26 October 1994 (26.10.94)	1-5
Y	-- WO 9600617 A1 (JOHS. TANDRUP METALVAREFABRIK APS), 11 January 1996 (11.01.96), cited by the applicant	6-7
A	-- EP 0454935 A1 (SOLID PLAST S.R.L.), 6 November 1991 (06.11.91)	1-5
	--	

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:
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"P" document published prior to the international filing date but later than the priority date claimed
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"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
5 Sept 1997	08 -09- 1997
Name and mailing address of the ISA/ Swedish Patent Office Box 5055, S-102 42 STOCKHOLM Facsimile No. +46 8 666 02 86	Authorized officer Jörgen Winther Telephone No. +46 8 782 25 00

INTERNATIONAL SEARCH REPORT

Information on patent family members

06/08/97

International application No.
PCT/DK 97/00274

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 5297735 A	29/03/94	AT 121826 T	15/05/95
		DE 4116932 A	26/11/92
		DE 59202003 D	00/00/00
		EP 0514749 A,B	25/11/92
		SE 0514749 T3	
		ES 2074305 T	01/09/95
EP 0621077 A1	26/10/94	DE 4308991 A	22/09/94
		JP 6343902 A	20/12/94
		US 5613638 A	25/03/97
WO 9600617 A1	11/01/96	AU 2785695 A	25/01/96
EP 0454935 A1	06/11/91	AU 6848290 A	07/11/91
		CA 2032578 A	28/10/91
		IT 516090 D	00/00/00
		IT 90005160 A	28/10/91
		JP 4228731 A	18/08/92
		US 5167431 A	01/12/92